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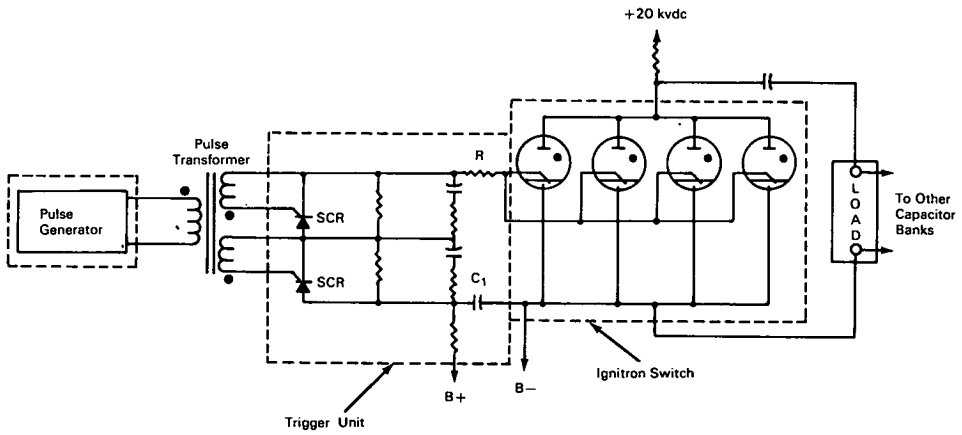
Compact SCR Trigger Circuit for Ignitron Switch Operates Efficiently



The problem: To design a compact, efficient circuit that will trigger an ignitron switch (consisting of four parallel-connected ignitrons) used to discharge high-energy (low-inductance) capacitor banks. The input pulse generator must be electrically isolated from the high-voltage circuitry in order to prevent arc-over between charged and uncharged capacitor banks and to protect operating personnel.

The solution: A trigger circuit utilizing two series-connected SCR's (silicon controlled rectifiers).

How it's done: An isolating pulse transformer couples the pulse generator to the input of the trigger circuit. The high peak current rating and voltage holdoff capability of the SCR's eliminates the need for a load matching transformer. It is necessary, however, to connect a current-limiting resistor (R) in series with the SCR's and the ignitor element of each ignitron to prevent damage to the SCR's. The SCR'S trigger the four ignitrons by discharging trigger capacitor C_1 directly through the discharge path comprised of the ignitor-to-cathode resistances in series with the limiting resistor R.

Notes:

1. The pulse transformer can be physically small because of its relatively low power requirements at the trigger circuit input. It can also be directly coupled to the pulse generator at a remote location to provide maximum protection from the high-voltage lines.
2. Since the SCR's are solid-state devices, the trigger circuit does not require a warmup period and operates at relatively high efficiency.
3. Matching of the ignitor-to-cathode resistances may be critical.

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